Name: Key

Linear Programming Practice Problem

A farmer has 20 acres for growing wheat and barley. The farmer has to decide how much of each to grow. The cost per acre for wheat is $30 and barley is $20. The farmer has budgeted $480. The profit on wheat is $130 and on barley is $100. Find the number of acres of each crop the farmer should sow to maximize profits.

a) **Define your variables** x = acres of wheat

x = acres of barley

b) **Write the objective function**

$P(x,y) = 130x + 100y$

c) **Write the constraints**

$x \geq 0$ $\quad x + y \leq 20$

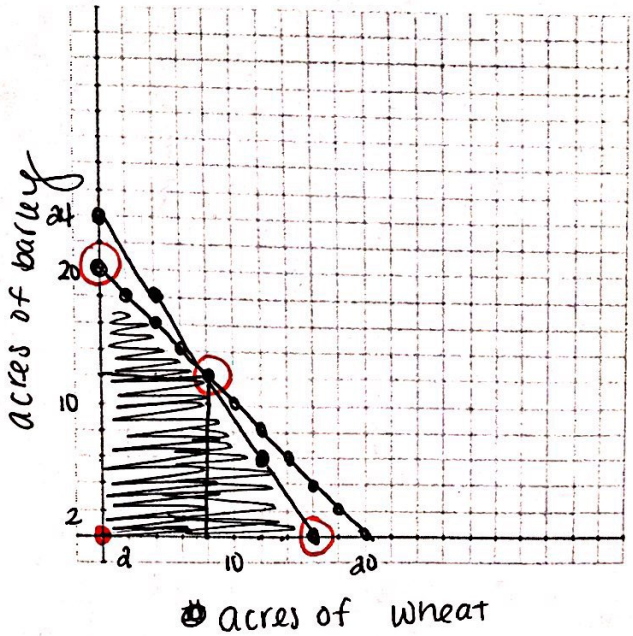
$y \geq 0$ $\quad 30x + 20y \leq 480$

d) **Graph the function.**

$y \leq -x + 20$

$\frac{20y}{20} \leq \frac{-30x}{20} + \frac{480}{20}$

$y \leq \frac{-3}{2}x + 24$



e) **Find the coordinates of each vertex.**

(0,0) (0,20)

(16,0) (8,12)

f) **The farmer should sow** 8 **acres of wheat and** 12 **acres of barley to get a maximum profit of** $2,240.

$P(0,0) = 0$

$P(0,20) = 130(0) + 100(20) = 2000$

$P(16,0) = 130(16) + 100(0) = 2,080$

$P(8,12) = 130(8) + 100(12)$

$1040 + 1200 = 2,240$